

PhET Gas Laws Simulation Exploration

Objective Students will be able to describe how pressure and volume and temperature are affected by a change in temperature and number of particles.

Use the following simulation

<https://phet.colorado.edu/en/simulation/legacy/gas-properties>

Answer the following questions on a separate sheet of paper before you begin simulation. For questions 6, 7 and 8 “a” needs to be done in excel labeling each graph using the variables. Compose a properly formatted email to send graphs saved to a single sheet as a pdf. and forward to Mr. Golden by 8:30am 9.Mar.2017. Save pdf. as follows, Name: Joe Schmo, Period 1 “**JoeSchmoPhETgaslawsP1**”

1. In terms of temperature, pressure and volume, what is happening when a hot air balloon inflates?
2. How are the arrangement of and movement of the particles that make up a gas different than the arrangement and movement of the particles that make up solids and liquids?
3. Open the simulation site and explore the Gas Laws simulation for a few minutes.
4. Record at least one interesting thing you notice while exploring this simulation. You may record as many things as you like.

Play with the simulator for a couple of minute to get a feel for how to manipulate volume (handle on left side of box, get ruler from “Measurement Tools” button), temperature (heat control slider under box) and pressure (pump handle). Use the simulation to complete the tables below.

When temperature increases	Volume will...	Why does this happen?	Pressure will...	Why does this happen?
When temperature decrease	Volume will...	Why does this happen?	Pressure will...	Why does this happen?

When particles are added	Volume will..	Why does this happen?	Pressure will...	Why does this happen
When particles are removed	Volume will..	Why does this happen?	Pressure will...	Why does this happen

5. Describe the relationships that you find while using the simulation. For example, “When using the simulation, I found that temperature and volume are (directly/inversely) related.”

P vs. T, P vs. V, V vs. T

Now take several measurements for each of the following, record units:

6. Data: (hold volume constant)

Pressure	Temperature

- Graph in excel.
- Conclusion; what relationship can you draw from the data between P and T?
- Real-world example:

7. Data: (hold pressure constant)

Volume	Temperature

- Graph in excel
- Conclusion; what relationship can you draw from the data between V and T?
- Real-world example:

8. Data: (hold temperature constant)

Pressure	Volume

- Graph in in excel
- Conclusion; what relationship can you draw from the data between P and V?
- Real-world example: